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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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23859	7590	04/22/2005	EXAMINER	
NEEDLE & ROSENBERG, P.C. SUITE 1000 999 PEACHTREE STREET ATLANTA, GA 30309-3915			BERMAN, SUSAN W	
			ART UNIT	PAPER NUMBER
			1711	

DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/699,994

Applicant(s)

SCRANTON ET AL.

Examiner

Susan W. Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 7-13, 28-30, 39, 47, 48, 50, 52, 54, 58-67 and 69 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 14-27, 31-34, 40-46, 49, 51, 53, 56 and 68 is/are rejected.
- 7) ☒ Claim(s) 35-38 is/are objected to.
- 8) ☒ Claim(s) 1-69 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/03, 11/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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Election/Restrictions

This application contains claims directed to the following patentably distinct species of the claimed invention: a process for producing a polymer or a process for producing an oligomer, different species of monomer (claims 3-14), different species of end group functionality (claim 23), different species of initiator system (claims 28-39), UV or visible light and different species of surfactant and co-surfactant (claims 19-22), a method comprising separating and purifying the polymers or oligomers or a method further comprising reacting end group functionalities of the polymers or oligomers to produce a copolymer.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1, 2, 15-18, 24-27, and 40-69 are generic.

Applicant is advised that a reply to this requirement must include an identification of a species of each component set forth above that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

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During a telephone conversation with Larry Villanueva on April 12, 2005, a provisional election was made with traverse to prosecute the invention of a method wherein the elected species is a method for producing a polymer wherein the monomer is butyl acrylate, the functional end groups are hydroxyl groups, the initiator is a two-component system comprising methylene blue and N-methyldiethanolamine and the surfactant is sodium dodecyl sulfate, claims 1-6, 14-27, 31-38, 40-46, 49, 51, 53, 55, 57 and 68. Affirmation of this election must be made by applicant in replying to this Office action. Claims 7-13, 28-30, 39, 47-48, 50, 52, 54, 56 and 58-67 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The election of species with respect to the photoinitiator is hereby withdrawn because no prior art has been found that teaches using a two-component system such as methylene blue and N-methyldiethanolamine as photoinitiator in a method as set forth in instant claim 1. Thus, claims 28-30 and 39 are rejoined with the elected claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 15, 17, 19, 30, 33, 55, 59, 68 and 69 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 1, line 6, claim 17, line 2, and in claims 59, 68 and 69,

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line 5, in the recitation "one type of ..." the word "type" renders the claims indefinite by making it unclear whether applicant intends to claim producing "monomer-soluble radical active centers" or producing some other moiety like, or of the same type as, "monomer-soluble radical active centers". It is suggested that "type" be replaced with "kind". If applicant intends to set forth that the initiator system produces only a single kind of active center and not one or more active centers, the claim should clearly so state. It is not clear what components are required to be present in the "water-soluble photo-initiator system" in order to produce monomer-soluble radical active center containing a "desired end group functionality" for a polymer or oligomer. In applicant's disclosure and examples the end group functionality appears to be derived from the co-surfactant rather than from the photoinitiator. Applicant has not clearly taught any photoinitiators containing hydroxyl, isocyanate, cyanide, nitro, nitrile or amine groups expected to become end groups in the polymer. Claims 15 and 55: It is not clear what is meant by the phrase "monomer is chosen for its preferred mode of termination". It is not clear how a specific monomer, which has a given terminating group by definition, can have a "preferred mode of termination". Does applicant intend to set forth a functional group of the monomer that terminates the polymer formed from the monomer? Claim 19 contains tradenames followed by the chemical names in parentheses. The tradenames and parentheses should be deleted in order to clearly set forth the chemical composition of the surfactants intended to be claimed. Tradenames do not clearly define chemical components because the trademarked materials are subject to change or discontinuation. Claim 30 includes "benzyl" as an initiator system component. Does applicant intend to recite "benzil" or a photoinitiator containing a benzyl group ($-\text{CH}_2\text{phenyl}$)? It is also suggested that the recitation "amino ketone" be changed to "amino phenylketone". Claim 33 recites "reduced potential". Does applicant intend to set forth a "reduction potential"?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 14-17, 21, 24-26, 31-34, 40-44, 46, 51, 53, 55-57, and 68 are rejected under 35 U.S.C. 102(b) as being anticipated by Capek et al, in the article “Kinetics of Photopolymerization of Butyl Acrylate in Direct Micelles”. Capek et al disclose a process of forming a microemulsion of butyl acrylate, surfactant and water and polymerization initiated in the presence of photoinitiator, such as 2,2-dimethoxy-2-phenylacetophenone, by monochromatic UV light. See pages 179-180. Capek et al teach that butyl acrylate forms an excited state upon irradiation and that the photoinitiator generates radicals, thus affecting molecular weight of the polymer (see page 180). Capek et al do not specifically mention providing end groups for the poly(butyl acrylate). However, the process of photoinitiated radical formation would provide a poly(butylacrylate) having butyl groups as desired end groups. The butyl groups can be considered to be functional end groups since the groups are subject to further reaction, for instance by hydrogen abstraction.

Claims 1-6, 12, 14-17, 19-28, 30-34, 40-44, 46, 51, 53, 55-57, and 68 are rejected under 35 U.S.C. 102(b) as being anticipated by Capek, in the article “Photopolymerization of Butyl Acrylate Microemulsion”. Capek discloses a process of forming a microemulsion of butyl acrylate and/or acrylonitrile, surfactant and water to which naphthalene, anthracene or benzophenone is added and initiating polymerization by exposure to monochromatic UV light. Capek teaches that butyl acrylate forms an excited state upon irradiation and that benzophenone in its triplet state can generate a radical pair through hydrogen abstraction from the emulsifier and quenching by monomer, thus affecting

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molecular weight of the polymer (see page 402). Capek does not specifically mention providing desired end groups for the poly(butyl acrylate). However, the process of photoinitiated radical formation would provide a poly(butylacrylate) having butyl groups as desired end groups. The butyl groups can be considered to be functional end groups since the groups are subject to further reaction, for instance by hydrogen abstraction. Furthermore, Capek teaches photoinitiated hydrogen abstraction from the emulsifier and teaches adding butanol as co-emulsifier and, therefore, discloses a process which would have been expected to provide hydroxyl end groups for the polymer derived from the interaction of hydrogen abstracting component and emulsifier.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 15-17, 19-28, 30, 40-44, 46, 49, 53, 55, 57 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo et al, in the article "Photoinitiated Polymerization of Styrene in Microemulsions" alone or in view of Morgan et al, in the article "Kinetics and Mechanism of Microemulsion Polymerization of Hexyl Methacrylate". Kuo et al disclose a method for polymerizing styrene in an oil/water microemulsion comprising surfactant, dibenzyl ketone photoinitiator, pentanol and water. Kuo et al teach that the molecular weight of the polymer can be easily controlled by controlling light intensity and time of irradiation. Kuo et al also teach that polymerization in microemulsions only occurs in the monomer reservoir encapsulated in the particle. See the Introduction.

The difference from the instantly claimed method is that, in the example, Kuo et al dissolve photoinitiator in an SDS aqueous solution and then add styrene, toluene and pentanol to the solution, followed by exposure to UV light (page 1217, "Methods"). Kuo et al do not mention radical active centers containing a desired end group functionality, however, the example discloses the presence of a photoinitiator and pentanol, thus providing for end group functionalities in the same manner as set forth by applicant. Applicant claims forming a microemulsion of monomer, water and surfactant, then adding water-soluble initiator system to the microemulsion, followed by exposure to light. It would have been obvious to one skilled in the art at the time of the invention to add the photoinitiator solution to the styrene, toluene, pentanol mixture to prepare the microemulsion comprising SDS, toluene, styrene, pentanol, water and dibenzyl ketone taught by Kuo et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of successfully obtaining a microemulsion and polymerizing the styrene monomer in the microemulsion because the microemulsion obtained would have been expected to be the same regardless of order of mixing the components. The polymerization in microemulsion taught by Kuo et al would have been expected to provide desired end group functionalities for the resulting polymer or oligomer since the microemulsion disclosed contains photoinitiator dissolved in aqueous solution and pentanol.

Morgan et al teach a model and rate for the conversion of a monomer in a microemulsion as a function of time and initiator concentration. Morgan et al teach that when a water-soluble free radical initiator is added to a microemulsion of monomer and surfactant, radicals are generated in the aqueous phase and enter the droplets of monomer-surfactant. As the radical propagates, monomer is recruited from the surrounding medium and chain growth terminates by chain transfer, bimolecular termination or coalescence of two growing particles. See page 1898, "3. Theory". It would have been obvious to one skilled in the art at the time of the invention add water-soluble initiator to the monomer/ surfactant mixture taught by Kuo et al in order to take advantage of the model for conversion and rate as a function

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of time and initiator concentration taught by Morgan et al. One of ordinary skill in the art at the time of the invention would have been motivated by an expectation of controlling the conversion of monomer and rate of polymerization in the method disclosed by Kuo et al, as taught by Morgan et al.

Claims 1-3, 5, 15-17, 24-26, 40-44, 46, 51, 53, 55-57, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abusleme et al (6,096,795). Abusleme et al disclose (co)polymerization of fluorinated olefinic monomers in aqueous emulsion, including microemulsion, in the presence of photoinitiators and UV-VIS radiation. The photoinitiator can be a water-soluble photoinitiator. Abusleme et al teach that the thermochemical stability of the copolymer produced depends on the nature of chain ends derived from the initiator and teaches selection of initiator to provide stable end groups. See column 2, line 59, to column 3, line 43. Example 8 teaches preparing a microemulsion of water, surfactant and initiator, adding monomer, exposing the microemulsion to continuous UV irradiation and further addition of initiator, thus disclosing the instantly claimed process steps.

The difference from the instantly claimed process is that Abusleme et al do not mention choosing an initiator system and an illumination scheme to produce a desired molecular weight. It would have been obvious to one skilled in the art at the time of the invention to select an initiator and exposure to UV light scheme to obtain a polymer having stable end groups and a desired molecular weight. It is known in the art that if UV exposure is stopped, the polymerization process will stop because the photoinitiator is not activated, thus one of ordinary skill in the art at the time of the invention would have been able to provide a polymer having a desired molecular weight. It would have been obvious to one skilled in the art at the time of the invention to select a water soluble photoinitiator to use in the process disclosed by Abusleme et al because Abusleme et al teach that the photoinitiator can be water soluble.

Claims 1-6, 14-34, 40-44, 46, 51, 53, 55-57, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al (5,952,398) in view of Uy et al (6,709,716) and Kozakiewicz et al (4,956,400). Dietz et al teach the instantly claimed method steps in column 7, lines 38-61, column 19 and column 23. Photoinitiators corresponding to those in the instant claims are taught in column 11 and in column 14. Monomers, including butyl acrylate, are taught in columns 10-11 and 13-14. Co-solvents, such as aliphatic alcohols, are taught in column 13, lines 1-13. Surfactants and "HLB" are disclosed in columns 16-19. The difference in the method is that Dietz et al teach it is preferred to mix monomers, surfactant and initiator and then add water to prepare the microemulsion. Dietz et al disclose polymers having functional groups, such as acid groups from acrylic acid, but do not specifically discuss controlling molecular weight and end groups of the disclosed polymer products. Dietz et al teach that final weight percents of components in a microemulsion can be varied within acceptable ranges by order of mixing and weight percents of each mixture used to form the microemulsion (column 20, lines 56-65). Uy et al disclose microemulsion compositions comprising the same components as Dietz et al and teaches preparing an aqueous microemulsion comprising monomers and initiators followed by irradiating.

Kozakiewicz et al disclose microemulsified functionalized polymers. The disclosed method is to prepare an aqueous solution (i) of monomer and functionalizing agent that is mixed with an oil solution (ii) and a surfactant (iii), to form a microemulsion, adding a polymerization initiator and polymerizing (column 3, line 38, to column 4, line 24). Example 2 discloses preparing an aqueous solution of monomer and surfactant that is added to an oil solution containing a photoinitiator to produce a microemulsion. Functional groups are taught in column 5, lines 19-48. Surfactants for obtaining HLB properties are disclosed. Kozakiewicz et al do not teach adding a water-soluble photoinitiator system to the microemulsion.

It would have been obvious to one skilled in the art at the time of the invention to mix monomers, surfactant and water and then add water-soluble initiators in the method disclosed by Dietz et al, as taught

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by Uy et al in an analogous method since the order of mixing is not limited by Dietz et al to the preferred method. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of providing a useful microemulsion for polymerizing the selected monomers. It would have been obvious to one skilled in the art at the time of the invention to include monomers having desired functional groups from the polymerizable monomers taught by Dietz et al in order to provide polymers having functional end groups, as taught by Kozakiewicz et al in analogous art. Ditez et al provide motivation by disclosing polymerizable monomers having an additional functional group. Kozakiewicz et al provide motivation by teaching that preparation of functionalized polymers in microemulsions eliminates large scale crosslinking problems in larger particle emulsions and allows polymers to maintain performance on crosslinking and to be prepared at high polymer solids content (column 4, lines 38-35).

Allowable Subject Matter

Claims 35-38 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The cited prior art does not teach the instantly claimed method wherein the photoinitiating system comprises the components set forth in claims 35-39

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan W. Berman whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Susan W Berman
Primary Examiner
Art Unit 1711

sb
4/20/05